

NAVAL WAR COLLEGE
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"Operation Earnest Will"

by

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LCDR United States Navy



A paper submitted to the Faculty of the Naval War College in the partial satisfaction of the requirements of the Department of Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature

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08 March 1994

Paper directed by
Captain David Watson, USN
Chairman, Department of Joint Military Operations

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Faculty Advisor

A handwritten date "2/18/95" in cursive script, written over a horizontal line.
Date

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Abstract

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This is an analysis on how the operational commander of "Operation Earnest Will" used the six principles of MOOTW and accomplished U.S. national security objectives. The six principles are: objective, unity of effort, security, restraint, perseverance and legitimacy.

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Introduction

"It is the world's littorals where the Naval Service, operating from sea bases in international waters, can influence events ashore in support of our [U.S.] interests."¹ There has been a shift from global containment to a regionally focused U.S. strategy. With this change in the direction of strategy, Military Operations Other Than War (MOOTW) have increase in importance. The United States/Kuwaiti Tanker Escort Mission, "Operation Earnest Will", provides a relevant model of an operation other than war. It was a contingency operation, conducted at a regional, low intensity level, in support of U.S. vital interests.

This is an analysis of "Operation Earnest Will", using the six principles of MOOTW: objective, unity of effort, security, restraint, perseverance, and legitimacy.² These six principles provide a framework and a context in which to survey "Operation Earnest Will".

Background

The Iran-Iraq War began in September 1980 when Iraq invaded Iran. In June 1982, under the leadership of the Ayatollah Khomeini, Iran began a counteroffensive and invaded Iraq. The instability in the region was complicated further by Khomeini trying to export Islamic fundamentalism throughout the region. In response to the growing uncertainty and the fear generated by the Iran-Iraq War, six moderate Gulf States formed the Gulf Cooperation Council (GCC) to provide for their

mutual defense and security. Not all these countries were neutral; for example, Kuwait and Saudi Arabia provided Iraq with military, financial and commercial support.

In 1984, Iraq expanded the war to the waters of the Persian Gulf. Using aircraft and mines, Iraq attacked Iranian shipping and oil terminals. In 1986, Iran retaliated by attacking non-belligerent shipping. They did this for two reasons. First, Iraqi oil, transported via pipeline through Turkey and Saudi Arabia, was out of reach of direct Iranian attack. Second, Iran wanted to prevent Kuwait and Saudi Arabia from supporting Iraq. Iran attacked ships using Iranian Republican Guard Corps (IRGC) small boats, navy ships, land based missiles, and eventually, mines.

These direct attacks, against their shipping, led Kuwait to ask for protection from the Soviet Union and from the United States in January 1987.³ Not until March 1987, after it appeared the Soviet Union would assist Kuwait, did the United States choose to escort Kuwaiti tankers. Two months prior to the first escort mission, the U.S.S. Stark (FFG-31) was mistakenly attacked by an Iraqi aircraft. Later, during the first escort mission, the reflagged tanker, Bridgeton, struck a mine. During the next twelve months there were several incidents involving the United States and Iran. For example, Iran attacked the reflagged tanker, Sea Isle City and the U.S.S. Samuel B. Roberts (FFG-58) struck an Iranian mine. In addition, the United States conducted countermine and

combat operations against Iran. In July 1988, the U.S.S. Vincennes (CG-49) shot down an Iranian civilian airliner.

Finally, after eight years of war, the belligerents committed to a UN cease fire in August 1988. In December 1988, the United States discontinued "Operation Earnest Will". By the end of the operation the U.S. Navy completed 127 escort missions that included (see Appendix A): 188 reflagged Kuwaiti tankers, 60 U.S. Military Sealift Command ships, seventeen other U.S. flagged ships and five non-U.S. flagged ships.⁴ The impetus for these operations was U.S. national security interests.

National Security Interests

The United States' national security interests centered around the western world access to oil resources. Though there was an oil glut at the time, and the U.S. purchased only five percent of its oil from the Persian Gulf⁵, any disruption in one source would adversely impact another source, due to the fungible nature of oil. Iran had the potential to disrupt the flow of oil. They had control of the Al Faw Peninsula which threatened Kuwait; and, they were attacking neutral shipping which threatened the Persian Gulf stability.

In addition to oil, credibility was another issue that affected U.S. national security interests. There were numerous events that caused the moderate Arab states to question U.S. reliability as an ally: (1) The United States had supported the Shah against Arab states, then they deserted

him; (2) the 444-day United States-Iran hostage crisis; (3) the U.S. Marine withdrawal from Lebanon in 1984; and, (4) the primacy of United States-Israel relations. The United States abandoned the Shah and abandoned Lebanon; whom would the United States abandon next? Another blow to U.S. credibility was the November 1986 revelation of the secret United States-Iran arms deal. With U.S. credibility at a nadir, the Reagan Administration needed to reassert U.S. influence in support of its interests.

National Security Strategy in the Persian Gulf

The strategy used to implement U.S. national objectives was disjointed and ambiguous. There was acrimonious debate among Congress, the administration and the media. Many important questions were raised. Would the United States side with one of the belligerents? Should the United States remain neutral? Were the risks worth the costs? The attack on the Stark, combined with United States elections (a year away), further polarized and politicized the domestic debate.

An effective security strategy must combine political and military means to achieve the national ends. The U.S. strategic goals in 1987 were: "ending the Iran-Iraq war; maintaining the trust and confidence of moderate Gulf states; maintaining U.S. presence in the Gulf; encouraging a more moderate Iranian government."⁶ The United States pursued its political ends through the United Nations, through a western European consensus (for U.S. policies) and by reflagged

Kuwaiti tankers. Reflagging was a political, not a commercial, request; and, the United States used military means to achieve this objective.

National Military Strategy in the Persian Gulf

The national military strategy is an extension of national security strategy. To be effective "Operation Earnest Will" would have to translate clearly the military ways and means into strategic ends. Would escorting tankers achieve U.S. strategic objectives? There were many arguments against this strategy. The risk was great. There was potential for the United States to become involved in the Iran-Iraq war. Assisting Kuwait, who was supporting Iraq, made it appear the United States was siding with one of the belligerents. How could escort operations compel Iran or Iraq to end the war? Some insisted "Operation Earnest Will" was unnecessary because the tankers that had been attacked represented such a small percentage of total shipping that the attacks had no effect on world oil prices. Iran (or Iraq) could continue their attacks unimpeded on unescorted ships; the eleven, reflagged Kuwaiti tankers were "...half of their [Kuwait's] fleet."⁷ Ultimately, the critics felt the efforts would be insufficient to achieve national ends. Why should an operational commander be concerned with these issues?

Understanding national ends is crucial to developing a successful plan because the operational commander cannot conduct his operation in isolation of national policy and

political will. He must "have a clear sense of strategic policy goals and objectives, how the use of military force fits into the overall national security strategy, and the desired end state."⁸

Building upon U.S. strengths in the region, an effective strategy could be developed that would address the critics' concerns. The U.S. military had been in the Gulf for forty years. Through this longevity, the U.S. military had cultivated relationships with members of the GCC, had developed military operating procedures and had a knowledge of the region. A plan combining these factors with the principles of MOOTW, could achieve national goals.

Six Principles of MOOTW⁹

Throughout United States history the U.S. military has conducted MOOTW. "The pace, frequency and variety, however, have quickened in the last three decades."¹⁰ Though the future cannot be predicted precisely, the historical trend appears that the U.S. military will continue to conduct MOOTW. Thus, reviewing past MOOTW can provide insight into conducting future military operations other than war and how to avoid repeating past mistakes.

During the evolution of MOOTW, the principles of objective, unity of effort, security, restraint, perseverance and legitimacy have become firmly established and have survived "the tests of time"¹¹. As a result, these six principles are incorporated into U.S. military doctrine. They

are delineated and defined in the service and joint military publications.¹² These principles, when applied to MOOTW, and combined with experience and thorough planning, can guide the operational commander toward successful military operations.

Objective: "Direct every military operation toward a clearly defined, decisive, attainable objective."

In military operations other than war, what constitutes success or failure? Due to the nature of this type of operation, there may be no action leading to a "definitive victory". Because of this, the operational commander must have clear objectives that reflect national interests and he must be prepared for a long term commitment in resources. Therefore, his expectations must be balanced with realistic actions. In "Operation Earnest Will", objectives were developed that, if achieved, would produce the desired end state. The military objectives were: "(1) freedom of navigation; (2) protect free flow of oil; (3) protect Gulf Arab friends from Iranian hegemony; and, (4) minimize Soviet influence in the region."¹³

In the short term, a completed transit would provide a measure of effectiveness for the U.S. military. Escorting Kuwaiti ships was a means to achieve the long term objectives. The objective was to show that Kuwaiti ships could transit international waters uninhibited. As a result, oil would continue to be transported by a "Gulf Arab friend". The U.S. presence would send a signal to the belligerents that the U.S. would protect its "friends" and its interests in the region.

This signal had the potential to stop the hegemony of Iran. By escorting Kuwaiti reflagged ships, the United States minimized the Soviet role.¹⁴ "Operation Earnest Will" could achieve national objectives.

Critics of these objectives have stated that the military commitment would result in a situation similar to the disastrous and disgraceful incident in Lebanon in 1984 when 253 Marines were killed. Unlike the 1984 "open-ended" U.S. Marine mission in Lebanon, the goals of the U.S. military in "Operation Earnest Will" were more than a "mere presence", or "deterrence". The objectives were clear, measurable, and attainable. The operational commander was able to concentrate on specific tasks to accomplish the escort mission. However, it did require a long term resource obligation. In order to regain credibility as a dependable ally, and to further U.S. interests, time, commitment and resolve were needed.

Unity of Effort: "Seek unity of effort toward every objective."

In the beginning, the command structure was disjointed, inadequate and overlapping. Two operational chains of command in the region led to problems in interoperability and coordination that produced an intolerable situation.¹⁵ It was not until after February 1988 when reorganization was completed that unity of command was achieved.

Seven months after the beginning of "Operation Earnest Will", specific command authority was established. The Commander of Joint Task Force Middle East (CJTfME) assumed the

duties of Commander, Middle East Forces. The result was the area of operations and forces were under one joint commander. The staffs were combined and streamlined. CJTFME established a staff structure with warfare commanders. The new command structure oriented the organization towards the threat and the mission. This contributed to quick responses to the continually changing environment, planning at the operational level, and reductions of both redundancy and friction between competing levels of command.

Unfortunately, that same unity of effort never was achieved completely in the area of coalition operations. The British, French and Dutch conducted simultaneous minesweeping and escort operations that were not coordinated with U.S. efforts. For example, "Prime Minister Margaret Thatcher refused to go along with any joint effort that puts British ships under non-British command."¹⁶ This was a shortcoming. Though without effective command and control, common rules of engagement (ROE) or national political will from each country, coalition operations would have been very difficult to achieve.

Security: "Never permit hostile factions to acquire an unexpected advantage."

In the beginning "Operation Earnest Will" was a security failure. The operational commander must ask: "What is the threat?" Then he must determine the vulnerabilities and capabilities of his forces, host country forces and the

belligerent forces. "A common mistake in low level war is to focus on potential for success and underestimate the full range of risks".¹⁷ Underestimating risk resulted in the U.S. military being unprepared for escort operations through minefields. At the operational level, mining was taken very seriously,¹⁸ however, at the national level, "The fact was no one . . . had taken mining seriously enough."¹⁹ This was a serious flaw in the plan, and the operational commander must guard against this disconnect estimating the risk.

Through innovation and perseverance, success was achieved, but at high cost. Initially, the mine threat gave Iran an "advantage" that jeopardized the mission. The United States had limited mine countermeasures capability. By varying the routes, times, speeds and loads of the tankers the United States attempted to mitigate the mine threat; this achieved limited success. Later, two Kuwaiti tugs with installed minesweeping gear and U.S. minesweeping helicopters provided additional support. Not until U.S. minesweepers combined with USN Explosive Ordnance Disposal teams were specific convoy routes effectively swept for mines. Even then, the threat was never totally countered.

Some critics, including former Secretary of the Navy, James Webb, felt security could only be achieved by going after the minelayers or conducting "massive retaliation" against Iran.²⁰ Yet, a "massive retaliation" could have resulted in operational failure. Webb's strategy did not

consider the nature of the Gulf. "Massive retaliation" could have resulted in the loss of support in the United States, if there were casualties; and, there could be a loss of support from the GCC, whose members had to live in proximity to Iran after the operation was completed.

The U.S. military required skills, strategy and operations that had to reflect the political and physical realities, both in the United States and in the region in which the forces operated. The political realities required a low level response, not "massive retaliation".

However, the U.S. military role did expand to meet security needs. The United States did go after the minelayers. For example, U.S. Army special operations helicopters operating from a navy ship attacked the Iran Ajr while it was in the act of minelaying. The ship was captured and her crew repatriated. Attacking this Iranian mine layer sent a clear signal, both to Iran and to the moderate Arab states, about the U.S. commitment.

Another example of the political realities surrounding security was the issue of no further basing of personnel in countries within the GCC. The solution was two large barges that were anchored in international waters in the northern Gulf. These were excellent U.S. platforms that allowed for the basing of helicopters, personnel and equipment. By their presence, the barges were able ". . . to deter mining"²¹. This innovative idea was agreed to reluctantly. "Most of the

Navy (Admiral Crowe, the Chairman of the Joint Chiefs of Staff, excepted) did not like the barges. In fact, some were openly hostile to them. . . ."22 Operational commanders need to be flexible and need to pursue innovative and unconventional ideas in response to the complex nature of MOOTW.

Another security challenge was the need to protect the convoys from surface and air threats. U.S. conventional advantages were severely limited in the extremely restrictive and dangerous environment of the Persian Gulf (see Appendix B). The convoy route was 700 miles from south of the Strait of Hormuz to the terminus at Kuwait. This transit was continuously vulnerable to attacks from air and sea. The convoy route came within twenty miles of Iran and Iraq war exclusion zones, and well within range of the Iranian silkworm sites of Queshm Island, Strait of Hormuz and the Al Faw Peninsula.²³ Adding to the security risk was the vicinity of land and oil rig platforms, and the number of commercial ships and aircraft operating in the Persian Gulf. Because of this environment, attacks could happen with as little as five minutes warning. To improve surveillance and increase warning time, AWACS early warning aircraft were added. But only after intense negotiations with Saudi Arabia were they allowed to be based in that country. Linking with surface combatant ships in the northern and southern Persian Gulf, the Saudi Arabian based Saudi and USAF AWACS provided needed radar coverage for

the convoys. In addition, the Persian Gulf was divided into U.S. navy combatant patrol sectors. This gave continuous surface and air coverage that protected the convoys.

Restraint: "Apply appropriate military capability prudently."

The U.S. military demonstrated superb restraint through clear and responsive rules of engagement (ROE) and limited military actions. These two points were extremely important in maintaining U.S. and GCC public support for the operation. Restraint prevented domestic and international calls for the United States to leave the Gulf.

Initially, the ROE were limited to self-defense. Yet, these expanded to meet various contingencies. There was an effective feedback system between the National Command Authority and the operational commander that contributed to flexibility in the ROE. For example, after the Bridgeton was damaged by a mine the United States did not respond. The damage was minimal and the Bridgeton was able to carry her intended load of fuel. In the act of minelaying, the Iran Ajr was attacked, then captured. In response to the Iranian attack on the Sea Isle City, the U.S. military warned, then attacked, an Iranian oil rig that the Iranians used as a base of operations. After the Samuel B. Roberts hit an Iranian mine, the U.S. military conducted a retaliatory strike called "Operation Praying Mantis". Each response was measured, proportional and against Iranian military targets. The U.S. military responses increased in severity and were intended to

send an unconfused signal to the belligerents: stop offensive action against neutral shipping. The U.S. actions limited Iran's ability to impose their will on "neutrals" and contributed to freedom of navigation.

Perseverance: "Prepare for measured, protracted application of military capability in support of strategic aims."

Through a focus on long term objectives and effective use of limited resources the U.S. military demonstrated perseverance. This was a key to a successful achievement of U.S. strategic aims. The United States needed to show a credible commitment and resolve to remain engaged. Had the United States departed the Persian Gulf after the first attack on U.S. forces, it would have appeared that the United States was abandoning an "arab friend". This would have been similar to U.S. actions in Lebanon in 1984. Unlike Lebanon in 1984, the United States provided adequate support and a force structure that allowed for a long term obligation. At the end of an 11,000 mile logistics pipeline, the operational commander combined local, civilian, and military sources to achieve full logistic support. Innovation and improvisation in logistical support allowed the ships to remain on station, fully combat ready. For example, needed supplies, parts, equipment and experts were expedited through traditional and non-traditional means. Ships refueled from civilian tankers and traded with local merchants. Ships used non-traditional, non-specification equipment, such as stinger missiles and 25mm

deck-mounted guns, which were not normally found in U.S. navy ships.

Setbacks did not cause the United States to depart the Persian Gulf. A setback, such as the Vincennes incident, was an error in judgement, not strategy, and did not deter the United States from the stated objectives.

Overtime, the mission increased. The United States expanded protection to include any friendly, innocent, or neutral vessels that requested help.²⁴ Escalation is a danger in long operations. Many critics saw this as an unlimited burden that would result in the United States becoming the "world's policeman". The operational commander must be vigilant and avoid unnecessary expansion of the mission. Fortunately, the Iran-Iraq war ended one month after this escalation. It was through perseverance the United States maintained presence, freedom of navigation, and support of Kuwait.

Legitimacy: "Sustain the willing acceptance by the people of the right of the government or of a group or agency to make and carry out decisions."

Legitimacy can enhance or detract from the mission. With the January 1987 Kuwaiti invitation, the United States was able to assert a military presence in support of strategic objectives. The invitation strengthen U.S. legitimacy.

United States and Kuwaiti interests were parallel. Both governments wanted to prevent Iran from imposing their will on neutral countries such as Kuwait, they wanted continued free

world access to Kuwaiti oil and freedom of navigation for Kuwaiti ships. Because of the Kuwaiti request, the United States was able to remain engaged without appearing to be hegemonic. The Kuwaiti invitation helped reduce regional suspicion about United States intentions. Kuwait willingly "accepted" U.S. military efforts that were in pursuit of U.S. interests; however, this may be an anomaly. Future military operations may not begin with a legitimate invitation for assistance, such as the "Operation Earnest Will" or Gulf War example.

In "Operation Earnest Will" there were problems with legitimacy. Members of the GCC did not want to be viewed as losing their sovereignty; therefore, no additional bases were allowed in GCC countries. In addition, public opinion in the United States was split over Persian Gulf strategy. There was concern about the appropriateness of supporting Kuwait and whether U.S. strategy would lead to a long, drawn out engagement that would end in war. Actions supporting restraint and security, for example, contributed to maintaining public support. Escalation, with U.S. casualties, would have eroded public confidence. This would have led to reduced legitimacy. The operational commander needs to ensure his actions contribute to maintaining public support. Legitimacy allowed the U.S. military to remain committed in the Gulf.

Conclusion

"Operation Earnest Will" was successful. The operational commander effectively applied each principle of MOOTW. The result was an integrated plan that achieved U.S. national security objectives and restored U.S. credibility. The six principles are extremely difficult to attain, with each overlapping and supporting the other. Every action should contribute to the attainment of a principle.

In "Operation Earnest Will", the objectives were explicitly articulated, achievable and sustainable. Unity of effort finally was realized through a joint task force operational chain of command. Initially, security was inadequate. However, through innovative solutions and a clearer focus toward the threat improved security was reached. Restraint was maintained throughout the operation as was shown by a flexible ROE and measured responses to Iranian attacks. Perseverance is extremely difficult in MOOTW. However, in this particular operation perseverance was achieved by a supported and a committed military. Legitimacy was provided by the request from the host nation and by support of the U.S. public.

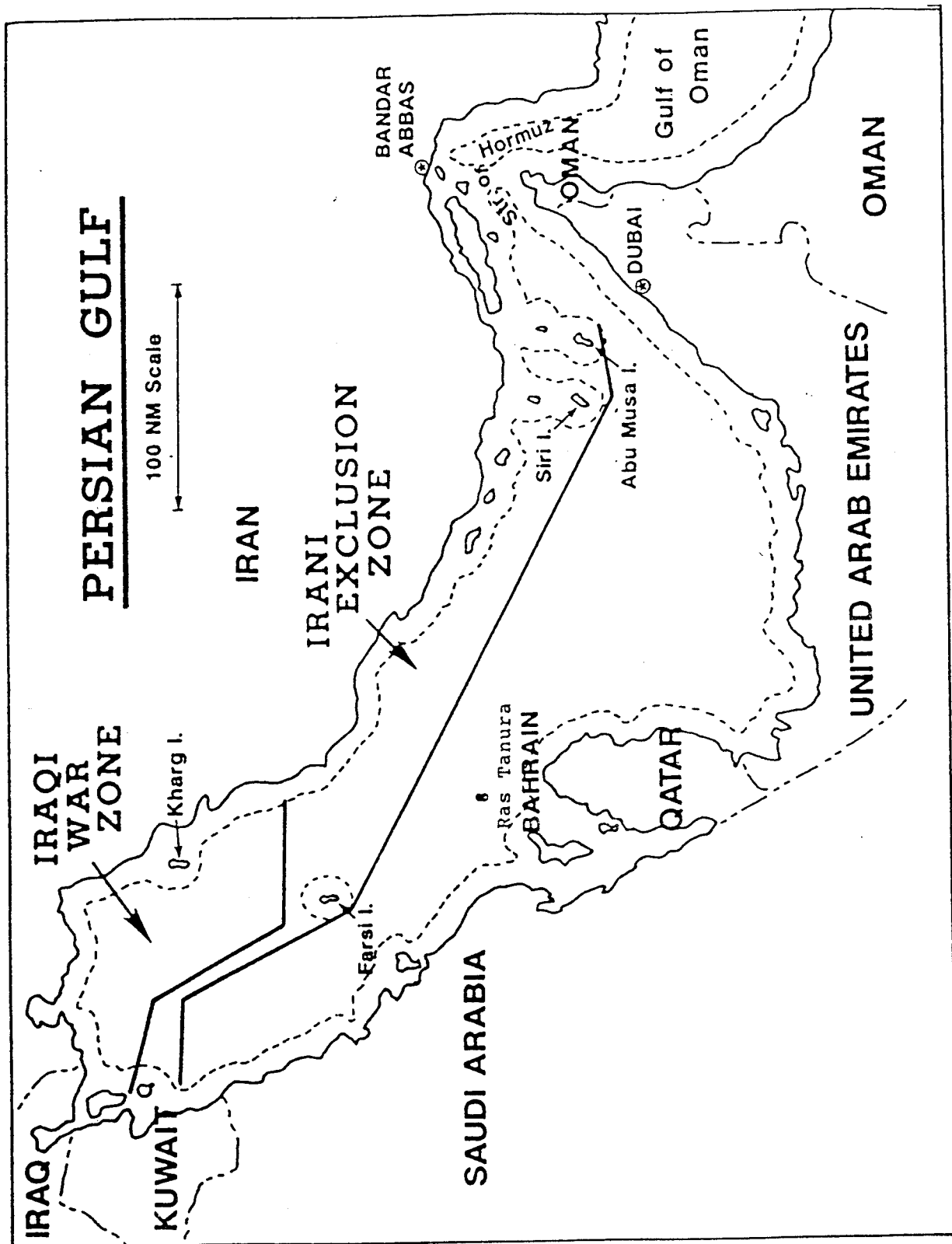
MOOTWs are increasing in frequency and importance. The study of past MOOTWs provide the operational commander the opportunity to apply past lessons learned toward future military operations.

APPENDIX A²⁵

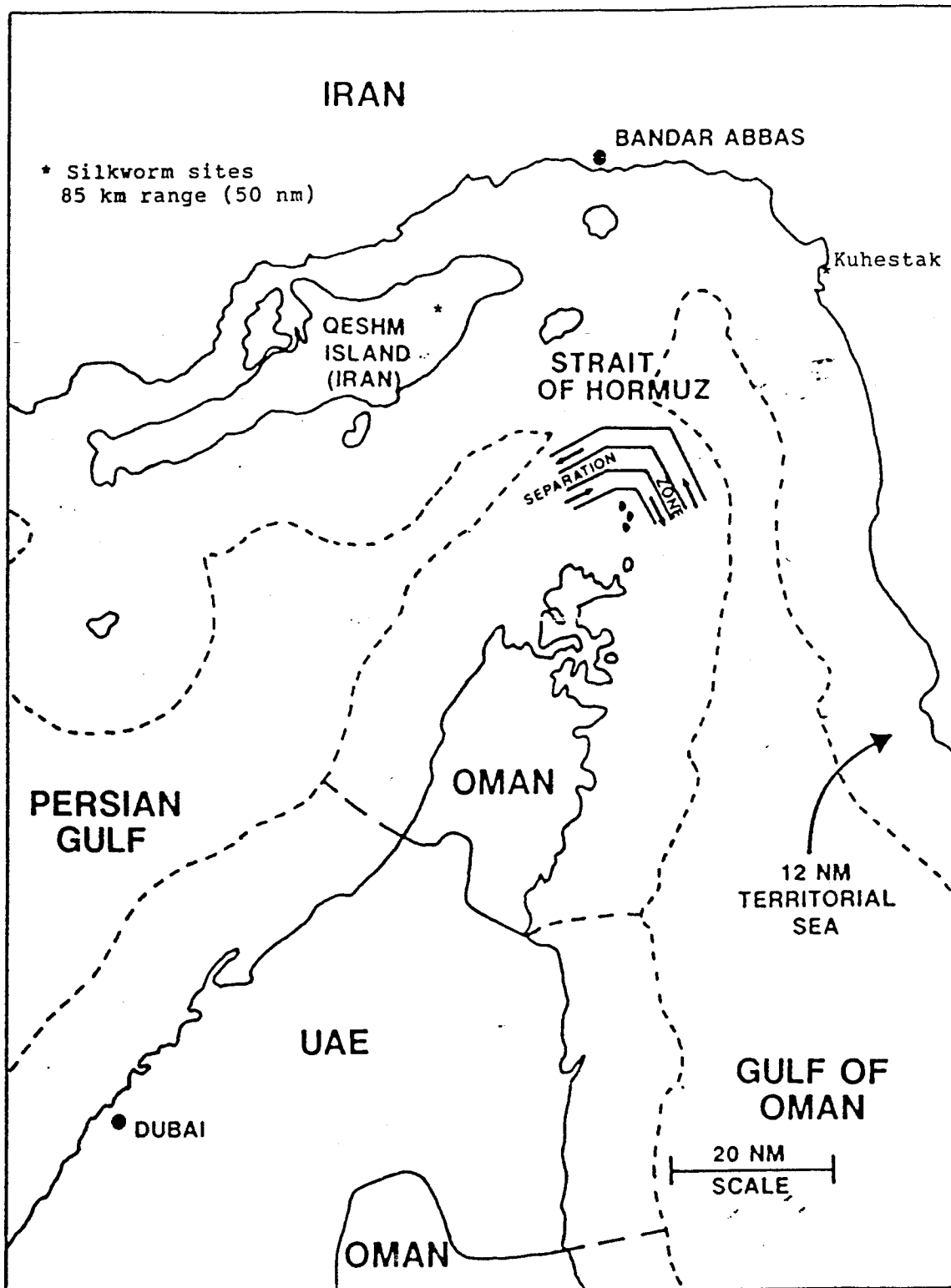
US NAVY CONVOYS: JULY 1987-DECEMBER 1988		
MONTH	NUMBER OF CONVOYS	NUMBER OF SHIPS ESCORTED
1987		
JULY	1	2
AUGUST	5	13
SEPTEMBER	4	9
OCTOBER	4	8
NOVEMBER	5	16
DECEMBER	3	11
1988		
JANUARY	7	16
FEBRUARY	7	18
MARCH	6	10
APRIL	7	18
MAY	6	14
JUNE	10	16
JULY	8	13
AUGUST	10	17
SEPTEMBER	7	17
OCTOBER	10	19
NOVEMBER	12	22
DECEMBER	15	20
TOTAL	127	259

ATTACK ON SHIPS IN THE PERSIAN GULF BY BELLIGERENTS, 1981-88									
ATTACKER/YR	81	82	83	84	85	86	87	88	TOTAL
IRAQ	5	22	16	53	33	66	89	38	322
IRAN	0	0	0	18	14	45	92	52	221
TOTAL	5	22	16	71	47	111	181	90	543
ATTACKS ON SHIPS IN THE PERSIAN GULF BY BELLIGERENTS, 1988									
ATTACKER/MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL-AUG	TOTAL	
IRAQ	8	5	6	0	7	1	11	38	
IRAN	7	7	13	7	5	3	10	52	
TOTAL	15	12	19	7	12	4	21	90	

Appendix B²⁷
Chart of Persian Gulf



Appendix B, cont'd
Chart of Strait of Hormuz



Endnotes

1. U.S. Dept of the Navy., Forward. . . From The Sea (Washington: 1994), p. 2.
2. U.S. Joint Chiefs of Staff, Joint Pub 3-0: Doctrine for Joint Operations (Washington: 1993), p. V-2.
3. U.S. Congress, House, Committee on Armed Services, National Security Policy Implications of United States Operations in the Persian Gulf, Staff Report (Washington: U.S. Govt. Print. Off., July 1987), p. 2.
4. Ronald O'Rourke, "Gulf Ops," U.S. Naval Institute Proceedings, May 1989, p. 49. There were 11 reflagged tankers. Ships are counted each time they were escorted.
5. Anthony Cordesman, The Gulf and the West: Strategic Relations and Military Realities (Boulder, Co.: Westview Press), p. 19.
6. House, Committee on Armed Services, p. 24.
7. Ibid., p. 11.
8. U.S. Dept. of the Army, Field Manual 100-5, Operations, (Washington: 1993), p. 1-4.
9. U.S. Dept. of the Army, Field Manual 100-5, Operations (Washington: 1993), 13-0; U.S. Joint Chiefs of Staff, Joint Pub 3-0: Doctrine for Joint Operations, (Washington: 1993), p. V-2. Definitions of the principles of MOOTW are quoted from these publications.
10. U.S. Dept. of the Army, Field Manual 100-5, Operations (Washington: 1993), p. 13-3.
11. Ibid., p. 13-3.
12. U.S. Dept. of the Army, Field Manual 100-5 Operations (Washington: 1993), p. 13-3; U.S. Joint Chiefs of Staff, Joint Pub 3-0: Doctrine for Joint Operations, (Washington: 1993), p. V-2.
13. "Earnest Will." JM 94-4/JULLS no. 20955-88372. UNCLASSIFIED. Joint Universal Lessons Learned System, 01 March 1989. SECRET/NF
14. Joseph P. Englehardt and others, "Armed Forces in the Persian Gulf: Politics by Another Name," National Security Program Discussion Paper, Harvard University, John F. Kennedy School of Government, Cambridge, MA: 1984, p. 123.

15. Interview with Captain D.J. Grieve, USN, Warfare Requirements Division Head, Joint Military Operations Department, Naval War College, Newport, RI: 8 February 1995. Captain Grieve was the operations officer on the staff of CJTFME during "Operation Earnest Will".

16. George Wilson, "US Role in the Gulf Expands," Washington Post, 30 April 1988, p. A1.

17. Anthony Cordesman, p. 328.

18. Interview with CDR J.A. Tenaglia, USN, Office of Naval Intelligence, Suitland, MD: 15 January 1995. CDR Tenaglia was Commander, Explosive Ordnance Disposal Task Unit 1987-88 during "Operation Earnest Will".

19. William J. Crowe, Jr., In the Line of Fire: From Washington to the Persian Gulf (New York: Simon and Schuster), p. 193.

20. James Webb, "Milo Minderbinder Would Be Impressed" Wall Street Journal, 18 July 1988, p. A18.

21. Anthony Cordesman, p. 369.

22. Casper Weinberger, Fighting for Peace. (New York: Warner Books, 1990) p. 409.

23. Bernard Blake, ed., Jane's Weapon Systems 1987 -1988 (London, England: Jane's Publishing Co., 1987), p. 486. According to this reference the silkworm missile used by Iran was the chinese variant of the Soviet Styx anti-ship missile. It can be operated from mobile or fixed sites. It has a range of 95 kilometers. The silkworm has a self contained radar for terminal guidance. It weighed between 2500 - 3000 kilograms with a 500 - 1100 lb warhead of high explosive.

24. George Wilson, p. A1.

25. Ronald O'Rourke, pp. 43 and 49.

26. Phillip Crowell, "Innovation and Operation in Earnest Will: a Blueprint for Future Low Level Conflicts," Unpublished Research Paper, Naval War College, Newport, RI: pp. 22-23.

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